WHAT IS CLAIMED IS:

1. A phototherapy apparatus for treating Alzheimer’s disease, characterized in that, comprising:

a hood body that is provided with a light transmittable cover at its inner side and loosely accommodates, rather than adapts to the patient's head, during the treatment the light transmittable cover has a gap of multiple centimeters with the head, so as to enable the head to rotate within a predetermined angle range and move in the up-down direction within a predetermined distance range;

an array of near-infrared irradiation units arranged in the hood body, which is constructed to emit, via the light transmittable cover, near-infrared light with an average irradiance greater than 40mW/cm^2 and less than 250mW/cm^2 towards the patient's head; and

a cooling mechanism configured to introduce cooled gas and send it into a cooled gas delivering inner cavity of the hood body, which is formed with the light transmittable cover, blowing it towards the patient's head through a cooled gas delivering pathway between the cooled gas delivering inner cavity and the patient's head to dissipate heat from the patient's head.

2. The phototherapy apparatus according to claim 1, characterized in that, the cooling mechanism comprises a refrigerator or is connectable to a refrigerator, the cooled gas delivering inner cavity receives the cooled gas generated by the refrigerator, and the cooled gas delivering pathway is formed between the inner wall of the cooled gas delivering inner cavity and the patient's head.

3. The phototherapy apparatus according to claim 1 or 2, characterized in that, the array of the near-infrared irradiation units is constructed to emit near-infrared light with a central wavelength of 800-820nm towards the patient's head.

4. The phototherapy apparatus according to claim 1 or 2, characterized in that, the array of

the near-infrared irradiation units is constructed to emit single wavelength near-infrared light with a central wavelength of 810nm towards the patient's head.

5. The phototherapy apparatus according to claim 1 or 2, characterized in that, the near-infrared light is a pulsed light, and the irradiation parameters of the near-infrared irradiation unit further include a pulse frequency, the pulsed light includes a pulse wave component at a first pulse frequency and/or a pulse wave component at a second pulse frequency, wherein the first pulse frequency is 7Hz-13Hz and the second pulse frequency is 30Hz-100Hz.

6. The phototherapy apparatus according to claim 5, characterized in that, the first pulse frequency is 10Hz and the second pulse frequency is 40Hz.

7. The phototherapy apparatus according to claim 5, characterized in that, each near-infrared irradiation unit comprises a plurality of near-infrared light-emitting diodes, and the pulsed light comprises pulse wave components with α wave frequency and γ wave frequency as the first pulse frequency and the second pulse frequency, respectively, and is formed by any of the following manners:

a waveform of the pulsed light emitted by each near-infrared light-emitting diode is formed by synchronous aliasing of α wave and γ wave;

the waveform of the pulsed light emitted by each near-infrared light-emitting diode is formed by time division combination of α wave and γ wave;

each near-infrared light-emitting diode in a first group of near-infrared light-emitting diodes emits pulsed light of α wave, each near-infrared light-emitting diode in a second group of near-infrared light-emitting diodes emits pulsed light of γ wave, and the first and second groups of near-infrared light-emitting diodes emit pulsed light synchronously.

8. The phototherapy apparatus according to claim 1 or 2, characterized in that, the cooled gas is blown towards the patient's head through the cooled gas delivering pathway with a wind speed of 0.5m/s to 3.5m/s.

9. The phototherapy apparatus according to claim 1 or 2, characterized in that, the irradiation parameters including the average irradiance of at least part of the near-infrared irradiation units are adjustable independently.

10. The phototherapy apparatus according to claim 1 or 2, characterized in that, the phototherapy apparatus is further configured to set the nodes of the brain network for targeted irradiation and the irradiation parameters, based on the functional connection parameters of the brain network of the patient related to Alzheimer's disease.

11. The phototherapy apparatus according to claim 1 or 2, characterized in that, the hood body is constructed to cover at least the whole brain of the patient, but not cover the eyes.

12. The phototherapy apparatus according to claim 10, characterized in that, the phototherapy apparatus is further configured to: under the condition that the node of the brain network for targeted irradiation is located deeply inside the brain, irradiate another node, which is easier to irradiate and forms a functional connection with the node located deeply.

13. The phototherapy apparatus according to claim 1 or 2, characterized in that,

the average irradiance of the near-infrared light emitted to the frontal lobe via the light transmittable cover is in the range of 50 mW/cm^2 to 250 mW/cm^2; and/or

the average irradiance of the near-infrared light emitted to the temporal lobe via the light transmittable portion is in the range of 70 mW/cm^2 to 250 mW/cm^2.

14. The phototherapy apparatus according to claim 1 or 2, characterized in that, in the case that the array of near-infrared irradiation units emits the near-infrared light to all the brain regions of the patient's head, the total power of the near-infrared light is 10W or more.

15. The phototherapy apparatus according to claim 1 or 2, characterized in that, the array of

near-infrared irradiation units is constructed to emit near-infrared light to nodes of a brain network, the nodes of the brain network at least include at least one of the medial prefrontal cortex, medial temporal lobe, cingulate cortex, precuneus, and inferior parietal lobe.

16. The phototherapy apparatus according to claim 15, characterized in that, the phototherapy apparatus is further configured to: cause the near-infrared irradiation units to emit near-infrared light to the nodes of the brain network, the functional connection strength of which with a hippocampus is weaker than a predetermined level, and the functional connection strength of each node with the hippocampus is determined by means of cerebral functional imaging of the patient.

17. The phototherapy apparatus according to claim 1 or 2, characterized in that, the hood body has a left convex ear portion and a right convex ear portion, and the left convex ear portion and the right convex ear portion are constructed to extend downwards below the patient's ears, so as to cover the left temporal lobe and the right temporal lobe of the patient, respectively, the left convex ear portion and the right convex ear portion are each provided with near-infrared irradiation units to emit near-infrared light to the covered temporal lobe region.

18. The phototherapy apparatus according to claim 17, characterized in that, the hood body further comprises a forehead portion, and has a curved connecting portion between the forehead portion and the left convex ear portion and the right convex ear portion, so that the lower edges of the left convex ear portion, the forehead portion, and the right convex ear portion are connected into a whole in a curved manner, so as to completely cover the left temporal lobe and the right temporal lobe of the patient.

19. The phototherapy apparatus according to claim 2, characterized in that, the hood body further includes a spacer, which is used to divide the chamber inside the hood body into a first chamber and a second chamber, wherein the first chamber is used to accommodate the near-infrared irradiation units, the second chamber is at least partially used as a cooled gas delivering

inner cavity, and the wall of the second chamber on its side facing the patient's head has light transmittance.

20. The phototherapy apparatus according to claim 1 or 2, characterized in that, the hood body comprises an outer layer and the light transmittable cover as an inner layer, and the cooled gas delivering inner cavity is formed between the outer layer and the light transmittable cover, the light transmittable cover is provided with a plurality of ventilation holes, so that each ventilation hole and the gap between the light transmittable cover and the patient's head form the cooled gas delivering pathway.

21. The phototherapy apparatus according to claim 20, characterized in that, the outer layer of the hood body includes a hot gas extraction inner cavity, which at least partially accommodates an electric circuit and is interconnected to the outside through an air inlet and an air outlet, so that the air introduced through the air inlet carries the heat generated by the electric circuit and discharges the heat to the outside through the air outlet.

22. The phototherapy apparatus according to claim 20, characterized in that, the top portion of the light transmittable cover is arch-shaped with a curvature less than a predetermined curvature, so that the introduced cooled gas diffuses gently to the periphery under the function of the arch-shaped top portion.

23. The phototherapy apparatus according to claim 1 or 2, characterized in that, there is a first predetermined distance between adjacent near-infrared irradiation units in the array of near-infrared irradiation units, there is a second predetermined distance between the array of near-infrared irradiation units and the head, and the adjacent near-infrared irradiation units cooperatively emit near-infrared light to the patient's head at a predetermined divergence angle, so that the emitted near-infrared light covers the target brain region in the case that the patient's head remains stationary or moves within a movable gap within the hood body, and the near-infrared light emitted by adjacent near-infrared irradiation units at a predetermined divergence

angle overlaps at least partially in the projection area of the head.

24. The phototherapy apparatus according to claim 23, characterized in that, the near-infrared irradiation unit is a lamp panel carrying a plurality of near-infrared LEDs, and there is a first predetermined spacing between two adjacent near-infrared irradiation units in the corresponding regions of the frontal lobe and the temporal lobe, such that the projection area of the near-infrared light emitted by each near-infrared LED of one near-infrared irradiation unit on the patient's head covers the projected area of the first predetermined spacing on each side of the near-infrared irradiation unit on the patient's head.